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Lexical Semantics and Argument Realization V

Thematic Hierarchies and Semantic Prominence

RELATED READING: Dik 1997; L&RH 2005, Chapters 5 and 6

1 The thematic hierarchy: An introduction

There is a pervasive, though often implicit, assumption that the lexical semantics-syntax mapping preserves facets of the semantic representation in the syntax, yet context dependence would appear to be at odds with this assumption. In order to see whether these ideas can be reconciled, this lecture examines a theoretical construct known as the thematic hierarchy.

The thematic hierarchy (TH) is often used to account for context dependence.
WHY? By its very nature it encodes prominence relations among a set of semantic notions; hence, an investigation into the nature of the TH has much to offer to the understanding of semantic prominence as it influences argument realization, but will also consider it for its own sake.

THEMATIC HIERARCHY: A language-independent ranking of possible semantic roles, which establishes prominence relations among them and is formulated because it figures in the statement of linguistic generalizations.

The TH is a theoretical construct intended to overcome the limitations of traditional individual semantic roles, particularly with respect to the statement of linguistic generalizations, mainly related to argument realization—i.e., subject and object choice.

EXAMPLE (inspired by Fillmore 1968): The thematic hierarchy in (3) together with the subject selection rule in (4) accounts for the grammaticality patterns in (2).

(1) If there is an A [=Agent], it becomes the subject; otherwise, if there is an I [=Instrument], it becomes the subject; otherwise, the subject is the O [=Objective, i.e., Theme/Patient]. (Fillmore 1968:33)

(2) a. The door opened.
b. Dana opened the door.
c. The chisel opened the door.
d. Dana opened the door with a chisel.
e. ∗ The door opened by Dana.
f. ∗ The chisel opened the door by Dana.

(3) Agent > Instrument > Theme/Patient

(4) The argument of a verb bearing the highest-ranked semantic role is its subject.

WHY THE TH IS ATTRACTIVE: It allows for reference to arguments in terms of their relative ranking, e.g., the argument bearing the "highest", "second highest", or "lowest" ranked semantic role, obviating the need to refer directly to arguments by semantic role.

THE UBIQUITY OF THS:
— The TH figures in accounts of many phenomena (e.g., argument realization, morpho-syntactic processes) and in the statement of typological implicational generalizations.
— The TH receives support from many languages.
— The TH is adopted in various theoretical frameworks.

USUAL WORKING HYPOTHESIS:
One and the same TH is valid for all languages and relevant phenomena.

THE PROBLEM: A lack of agreement about the RIGHT TH:
proposed THs differ as to (i) the roles ranked and (ii) the ranking of these roles.

USUAL STRATEGY PROPOSED TO MAINTAIN THIS HYPOTHESIS:
Closer scrutiny of empirical evidence will provide arguments in favor of a particular TH:
e.g., the exchange between Bresnan & Kanerva (1989, 1992) and Schachter (1992).

HOWEVER: "There is reason for strong doubt that there exists a Thematic Hierarchy provided by UG. That seems to be the best explanation for the fact that after over three decades of investigation, nobody has proposed a hierarchy of theta-roles that comes close to working." (Newmeyer 2002:65)

STARTING POINT: Much can be learned from notion of a TH—it shouldn't just be dismissed.

RESEARCH STRATEGY: Restrict attention to one domain:
Uses of the TH involving argument realization broadly construed (cf. Dowty 1991);
leave open possibility that other appeals to the TH are relevant or related.

GOALS:
— Identify the roots of the controversies concerning the ranking of semantic roles through a careful comparative examination of existing THs.
— Understand what the rankings defining proposed THs are meant to represent and their connection to the generalizations they figure in.
— Improve understanding of semantic prominence as it figures in argument realization.

CONCLUSIONS:
— No single TH can cover all the generalizations that THs have figured in.
— THs may capture valid linguistic generalizations, but are derivative constructs.
— THs are appealed to in accounts of varied facets of argument realization,
which are sensitive to different semantic dimensions;
as these semantic dimensions might impose different rankings on arguments,
different rankings are relevant to different facets of argument realization.
— Some apparent TH effects don't truly involve semantic roles, but rather implicate other properties that largely correlate with semantic roles.
— Semantic prominence is partially attributable to structure of semantic representation.

2 The major motivation for use of a TH

Accounting for pervasive CONTEXT DEPENDENCE in lexical semantics-syntax mapping:
Particular semantic roles need not consistently be associated with a specific syntactic realization, with the exact realization depending on cooccurring roles.

TH is used to capture attested/preclude unattested role-grammatical relation mappings.

CONTEXT DEPENDENCE AMONG COARGUMENTS OF A VERB:

Priorities among a verb's coarguments with respect to their potential realization.

(5) An instrument can't be realized as subject in the presence of an agent; see (2).

(6) Agent > Experiencer > Theme (Grimshaw 1990)

a. The toddler (*deliberately) feared the lion.

b. The lion (deliberately) frightened the toddler.

(7) Agent > Recipient > Theme (Speas 1990)

a. Alex received a package.

b. Sam sent Alex a package.

And an example of context dependence from Kinyarwanda:

(8) Which "oblique" role can be the object of an applicative verb depends on cooccurring obliques. (Polinsky & Kozinsky 1992: 440, (40))
Recipient > Benefactive > Possessor > Causee > Instrument > Comitative

CONTEXT DEPENDENCE ACROSS LANGUAGES:

Typological generalizations, applicable across languages, defining a set of possible languages with respect to the options for the realization of various semantic roles as subject and object.

Whether a given semantic role can be a subject (or object) in a particular language depends on what other roles can be subjects (or objects) (Dik 1978, 1997; Givón 1984, 1990, 2001).

(9) ... For any language, if Subj or Obj function can be assigned to some semantic function S_j, then Subj or Obj can be assigned to any semantic function S_i, such that S_i precedes S_j in SFH [=Semantic Function Hierarchy, i.e., the thematic hierarchy] (for Obj assignment, $S_i \neq$ Ag). (Dik 1978: 76)

NOTE: The ranking of semantic roles relevant for one form of context dependence may not be relevant for the other.

3 The many statements of the TH

Despite frequent appeals in various theoretical frameworks, there is little agreement about the "right" thematic hierarchy. Major points of divergence among attested THs include:

• THE SET OF SEMANTIC ROLES TO BE INCLUDED IN A TH:
— Some THs include only "arguments"; others also include "adjuncts".
— Some THs appeal to finer-grained roles than others; e.g., some distinguish between spatial goals and abstract goals (i.e., benefactives, recipients), while others lump goals in with locations.

• THE CORRECT RANKING OF THESE ROLES:
— The ranking of themes/patients in general.
— The relative ranking of goals and locations with respect to themes.
— The use of a total or partial ordering on semantic roles.

NOTES: In the THs below, "L" is location, "S" is source, "G" is goal; some oblique roles are omitted from bottom of Dik's, Fillmore's 1971, Givón's, and Speas' THs. Roles ranked together are separated by a slash. Dik's "goal" and Fillmore's "objective" are relabelled "patient" to facilitate comparison.

No mention of goal and location:

Belletti & Rizzi 1988:	Agt >		Exp >	*Th*
Fillmore 1968:	Agt >	Inst >		*Pat*

Goal and location ranked above theme/patient:

Grimshaw 1990:	Agt >		Exp >	G/S/L >	*Th*
Jackendoff 1972:	Agt >			G/S/L >	*Th*
Van Valin 1990:	Agt >	Eff > Exp >		L >	*Th* > *Pat*

Goal and location ranked below theme/patient:

Baker 1989:	Agt >		Inst >		*Th/Pat* >	G/L	
Baker 1997:	Agt >				*Th/Pat* >	G/P/L	
Carrier-Duncan 1985:	Agt >				*Th* >	G/S/L	
Dik 1978:	Agt >				*Pat* >	Rec > Ben	> Inst
Fillmore 1971:	Agt >	Exp >	Inst>		*Pat* >	G/S/L	
Jackendoff 1990:	Act >			*Pat*/Ben >	*Th* >	G/S/L	
Larson 1988:	Agt >				*Th* >	G	> Obl
Speas 1990:	Agt >	Exp >			*Th* >	G/S/L	

Goal above theme/patient; location ranked below theme/patient:

Bresnan & Kanerva 1989:	Agt >	Ben >	Rec/Exp >	Inst >	*Th/Pat* >	L
Kiparsky 1985:	Agt >	S >	G >	Inst >	*Th/Pat* >	L
Givón 1984:	Agt >		Dat/Ben >		*Pat* >	L > Inst

4 Preliminaries: Factoring out complicating issues

• SPURIOUS APPEALS TO THE TH

EXAMPLE 1: Nishigauchi (1984) uses the TH to account for control in subjectless infinitives; Ladusaw & Dowty argue control patterns are "ultimately determined by entailments of verbs together with principles of human action that exist quite apart from language" (1988:73).

EXAMPLE 2: An applicative morpheme only introduces an argument whose semantic role is lower on the TH than that of one of the verb's own arguments (Alsina 1999; Bresnan & Kanerva 1992).

Motivating observation: Verbs whose only argument is a patient (e.g., *fall*) may take location but not benefactive applied objects.

(10) Agt > Ben > Rec/Exp > Inst > Th/Pat > Loc

Problematic data: Chicheŵa counterpart of 'Jesus died for all people' has a benefactive applied object (Alsina & Mchombo 1993: 36).

A solution: The applicative morpheme simply accompanies the addition of an argument (Alsina & Mchombo 1993).

A better solution: A benefactive is only introduced if it has a coargument which controls the event.

Typically, benefactives need an agent coargument to meet this condition, but *die* is special: its theme assumes control over the event in the context of religious martyrdom (Van Valin & Wilkins 1996).

The *die* example violates the TH-based generalization, but not the deeper generalization.

The Lesson: A phenomenon may be governed by a semantic property which does not define a semantic role, although it may distribute across roles systematically.

• EXTENSIONS OF SEMANTIC ROLE LABELS

Rankings of roles can be compared only if role labels have the same extension.

EXAMPLE: The notion "goal". Some researchers reserve this term for purely spatial goals; others use it for what might be called "abstract" goals, including recipients, benefactives, and experiencers; for still others it covers all these notions. Yet others dispense with an independent goal role, subsuming all types of goals under a broadly defined location role.

• INTERDEPENDENCE OF ROLE RANKING AND MAPPING ALGORITHM

Failure to recognize that a mapping algorithm and the ranking of roles in the accompanying TH are inderdependent. Some conflicting rankings can be traced to different statements of the associated object selection algorithms. Once the difference in algorithms is recognized, the difference in ranking largely turns out to lack empirical consequences.

EXAMPLE: A hierarchy of the form 'Agt > ... > Pat' may be empirically equivalent to 'Agt > Pat > ...' with respect to object selection, if the former is paired with a bottom-up object selection algorithm and the latter with a top-down algorithm.

(11) Marlo put the snake in the garden.

a. Bottom-up algorithm plus 'Agent > Location > Theme'

b. Top-down algorithm plus 'Agent > Theme > Location'

• INTERDEPENDENCE OF ROLE RANKING AND SYNTACTIC THEORY

Assumptions about syntactic representation which accompany the THs may affect argument ranking (e.g., mono- vs. multi-stratal theories of syntax) since they may affect the semantic role/grammatical relation associations that need to be accounted for. Although there may be repercussions for ranking, they largely do not have empirical consequences.

EXAMPLE: A theme/patient can be the subject of an intransitive verb or the object of a transitive.
A monostratal theory requires the theme/patient to have subject and object realizations, while a multistratal theory, incorporating the Unaccusativity Hypothesis, requires object realization.
Since subject selection always works down the TH, a monostratal theory must ensure that the theme/patient is ranked high enough to take precedence over other relevant roles; this concern does not arise in multistratal theories.
That is, the ranking in (11b) would be preferred to that in (11a).

5 A case study in semantic prominence: Ranking benefactives/recipients

Hierarchies differ as to:
— whether or not benefactives and recipients are ranked together.
— relative ranking of theme/patient with respect to these roles.

• Factors entering into joint ranking:

— When recipients and benefactives are expressed via a "core" grammatical relation (e.g., first object (English) or dative NP (German)), they cannot cooccur (**I mailed Mom Pat the letter*); thus, no need to distinguish these roles when ranked relative to, say, theme/patient.

— Other generalizations do distinguish between recipients and benefactives.
  – Polinsky & Kozinsky's generalization about which role has precedence in access to direct object expression in applicatives
  – Dik's generalization re likelihood NPs with particular roles are subjects or objects.

WHY? Perhaps, recipients are ranked above benefactives because recipients, but not benefactives, are arguments of their verb and, hence, more likely to become objects.

• Factors entering into ranking 'theme/patient > rec/ben' (Dik 1997)

— To capture the generalization that all languages allow patient direct objects, but only some allow recipient or benefactive direct objects (at least, in surface coding).

— In a monostratal framework, to capture the generalization that patients can be subjects in all languages, patient needs to be high on the hierarchy.

WHY? The ranking 'theme/patient > rec/ben' may arise as recipients and benefactives are usually expressed with dedicated "semantic cases", unlike theme/patients. Hence, theme/patients are more likely to be basic objects across languages, and only languages with a way of "advancing" recipients and benefactives to object will have them as objects.

• Factors entering into ranking 'rec/ben > theme/patient' (Givón 1984)

This ranking expresses the observation that recipients and benefactives often usurp certain "coding" properties of objects when they cooccur with patients.
WHY? Recipients and benefactives are typically filled by animate NPs, unlike theme/patients. Animates are more likely to be topics than inanimates, and topical NPs tend to show these coding properties.
Ultimately, the observations underlying this ranking follow from animacy considerations; semantic roles—and, hence, the TH—are only indirectly implicated (cf. Evans 1997).

6 The TH in argument realization

The TH is used to define constraints on argument realization, allowing attested and precluding unattested pairings of semantic roles with grammatical relations.

INGREDIENTS OF A TH: A set of semantic roles and a prominence relation defined over them.

Semantic roles, as labels for classes of arguments, are now generally considered derived notions; thus, a TH, as it is composed of semantic roles, should be derived, too.

Two approaches to defining semantic roles via more basic elements of semantic representation:
— via event structures (roughly, predicate decompositions): a relatively structured form of lexical semantic representation.
— via lexical entailments: a relatively unstructured form, often associated with a prototype approach to semantic roles.

These two approaches to semantic roles dovetail with two understandings of "prominence" in a TH (Bresnan & Kanerva 1989:23-24):
— An encoding of relations of "semantic" structural prominence among a verb's arguments.
— A "salience" hierarchy, sometimes taken to reflect relative topicality of arguments.

6.1 The TH as a reflection of event structure prominence

ONE UNDERSTANDING OF THE DERIVATIVE STATUS OF SEMANTIC ROLES:
Semantic roles are labels for argument positions in an "event structure":
a structured representation of an event, usually a predicate decomposition.

Prominence relations among arguments, defined over positions in the event structure, induce a ranking of the corresponding semantic roles, giving rise to a TH.

(12) a. [[x ACT] CAUSE [BECOME [y <*STATE*>]]]
b. agent/causer (= first argument of ACT) > patient (= argument of *STATE*)

The TH represents the relative depth of embedding of semantic roles in the event structure (e.g., Baker 1996, 1997; Jackendoff 1990).

(13) Order the A-marked arguments in the action tier from left to right, followed by the A-marked arguments in the main conceptual clause of the thematic tier, from least embedded to most deeply embedded. (Jackendoff 1990:258, (29))

THE RESULTING CONCEPTION OF THE TH: It reflects the internal "structure" of verb meaning. (i.e., it is a collapsing of semantic prominence relations encoded in an event structure.

This conception of the TH has also been given a second grounding:
It reflects order of semantic composition of arguments with their verb (Larson 1988).

(14) ... the hierarchy of Th-roles defines the order in which arguments are semantically combined with their predicates. Namely, a verb is first combined with the argument linked to its innermost Th-role, the resulting predicate is combined with the argument linked to its next lowest Th-role, and so on. (Kiparsky 1985:30)

Certain linguistic phenomena (e.g., compound formation, noun incorporation) are said to directly reflect order of composition. Asymmetries in these phenomena are explained by appeal to TH.

(15) a. story-telling to children (theme left member of compound)
b. ∗ children-telling of stories (recipient left member of compound)

(16) Recipient > Theme

BUT: To be meaningful, order of composition must reduce to depth of embedding.
WHY? Alternative orders of composition of the arguments of a single predicate have no detectable semantic effect (Kratzer 1996).
(In fact, this idea is instantiated in many syntacticized semantic representations, where each argument of a verb is associated with its own verbal head.)

Not surprisingly, some researchers suggest the TH reflects both depth of embedding and order of argument composition (Kiparsky 1997; see also Wunderlich 1997a, 1997b).

CONSEQUENCES OF THIS CONCEPTION FOR ARGUMENT REALIZATION

• THE STATUS OF THE TH: The TH is not an independent construct, but a generalization over possible event structures; its statement is a matter of convenience.

• THE SEMANTIC ROLES THAT FIGURE IN THE TH:

— Since this conception is defined with respect to verbs and their arguments, it can only apply to arguments—and not adjuncts—and then only to coarguments of a verb.

— Each event structure defines a set of roles that may cooccur as arguments of verbs. The inventory of event structures determines the possible sets of cooccurring roles, and, thus, what sets of roles may be ranked. There is no way of ranking noncooccurring roles.

— The roles will be coarse-grained, as they name positions in an event structure, and there are taken to be fairly few event structures involving a small set of rather general predicates.

— A role in such a TH may stand in for several related finer-grained roles in other THs.

EXAMPLE: The first argument of the frequently posited predicate CAUSE is taken to define a semantic role. This role is usually identified as "agent" (e.g., Jackendoff 1972), but it is probably more accurately labeled "causer" since the first argument of CAUSE is not filled only by agents in a strict sense; for some verbs, it could also accommodate natural forces and certain instruments (Baker 1997; Van Valin & Wilkins 1996).

• THE CONTRIBUTION OF SUCH A TH TO ARGUMENT REALIZATION:

Semantically more prominent arguments are mapped onto structurally higher syntactic positions (Belletti & Rizzi 1987; Carrier-Duncan 1985; Larson 1988; Ostler 1979).

(17) ... the lowest role on the Thematic Hierarchy is assigned to the lowest argument in constituent structure, the next lowest role to the next lowest argument, and so on. (Larson 1988:382)

Need independent criteria to establish when one argument of a multiargument verb is semantically less embedded than a second.

— When such a verb has a complex event structure, comprised of one event embedded in a second, then an argument of the higher event is less embedded than an argument of the lower event and should outrank it in the TH.

EXAMPLE: Causative verbs (e.g., *break*, *kill*) have been attributed a complex event structure (Dowty 1979; McCawley 1971; Morgan 1969; von Stechow 1995, 1996). In this event structure the caused event containing the patient is embedded under CAUSE, which also takes the causer as an argument, justifying the ranking 'causer > patient'.

(18) [[x ACT] CAUSE [BECOME [y <*STATE*>]]]

— When such a verb is noncausative and has a simple event structure, there is a problem:
e.g., with verbs like *wipe, scratch, want, see, love, have*.
As one argument is realized as subject and the other as object, one must be more prominent than the other, yet their relative ranking cannot be established independent of their morphosyntactic realization, which the ranking is supposed to predict.

THE PROBLEM EXEMPLIFIED: RRG's actor-undergoer hierarchy

(19) (Revised) RRG actor-undergoer hierarchy (Van Valin & LaPolla 1997:126-27):

Arg of DO	>	1st arg of **do**′(x,...	>	1st arg of **pred**′(x, y)	>	2nd arg of **pred**′(x, y)	>	Arg of state **pred**′(x)

In this hierarchy, the semantic representations of many two-argument verbs implicitly assume a prominence relation between their arguments: they identify a "first" and "second" argument of **pred**′(x, y).
Yet an independent criterion for establishing first and second argument is lacking.
This issue arises for verbs of pure location, perception, cognition, desire, possession, and emotion (e.g., *love*).

6.2 The TH as a reflection of the "salience" of event participants

A SECOND UNDERSTANDING OF THE DERIVATIVE STATUS OF SEMANTIC ROLES:
Semantic roles are defined in terms of sets of lexical entailments imposed by verbs on their arguments by virtue of the parts they play in the events the verbs describe.

Semantic roles represent clusters of "event-based" properties of arguments, with each property contributing to the ranking of arguments, and, hence, to the place of the semantic roles defined over them in a TH.

THE BEST KNOWN EXEMPLAR: Dowty's (1991) proto-roles, which allow the content of traditional semantic roles to be unpackaged into more basic semantic components said to be determinants of subjecthood and objecthood, but these components do not constitute a set of jointly necessary and sufficient conditions on any given semantic role—hence, the notion "proto-role".

(20) Contributing properties for the Agent Proto-Role:
— volitional involvement in the event or state
— sentience (and/or perception)
— causing an event or change of state in another participant
— movement (relative to the position of another participant)
— (exists independently of the event named by the verb)
(Dowty 1991: 572, (27))

(21) Contributing properties for the Patient Proto-Role:
— undergoes change of state
— incremental theme
— causally affected by another participant
— stationary relative to movement of another participant
— (does not exist independently of the event, or not at all)
(Dowty 1991: 572, (28))

NOTE: Some Proto-Agent and Proto-Patient entailments come in pairs
(Dowty 1991:574; Croft 1998:37; Koenig & Davis 2001:83; Primus 1999:52–53):
— Proto-Agent "causing an event or change of state in another participant"
and Proto-Patient "undergoes change of state"
— Proto-Agent "movement (relative to the position of another participant)"
and Proto-Patient "stationary relative to movement of another participant".
Paired entailments arise due to asymmetric relations between event participants, and,
thus, they implicitly define a ranking of arguments (e.g., control relation, Primus 1999).

THE RESULTING CONCEPTION OF THE TH:
The TH may be seen as the "cumulative result of interacting relative prominence relations
among semantic entities" (Mohanan 1994:28).
Thus, if semantic roles are defined by sets of lexical entailments, a TH made up of
such roles would represent a conflation of the effects of such statements.

Roots of this idea: Fillmore (1977:102) suggests the TH be replaced by a series of rankings:

(22) a. An active element outranks an inactive element.
b. A causal element outranks a non-causal element.
c. A human (or animate) experiencer outranks other elements.
d. A changed element outranks a non-changed element.
e. A complete or individuated element outranks a part of an element.
f. A 'figure' outranks a 'ground'.
g. A 'definite' element outranks an 'indefinite' element.

(23) The intention is that this hierarchy is to be consulted in the order in which these statements are listed, Thus, an active element outranks everything else, a causal element outranks everything but an active element; and so on. (Fillmore 1977:102)

(24) a. … since every sentence has to have a subject, the scene entity that has the highest rank will be realized as the subject …
b. … if two entities are in the nucleus, that is, are in perspective, the roles of the first and second terms will be allocated according to relative position in the hierarchy.
c. If it is a verb that can take either of two things as direct object, the one that outranks the other on the Saliency Hierarchy wins out.

(Fillmore 1977:102)

Properties in (22) overlap considerably with Dowty's Proto-Agent and -Patient entailments.
This suggests agreement in the semantic elements most important to argument realization.

WHAT DOES "PROMINENCE" MEAN IN STATEMENTS SUCH AS THOSE IN (22)?

Fillmore (1977): such statements specify the relative "salience" of event participants.
Roles are ranked not in terms of their position in an event structure, but rather in terms
of the semantic components that contribute to "salience" or perhaps "topicworthiness":
Givón (1984) and Hawkinson & Hyman (1974) see the TH "as representing a scale of
discourse topicality of argument types rather than an order of semantic composition"
(Bresnan & Kanerva 1998:23-24).

The TH, then, is similar to various natural prominence scales, which are appealed to in accounts of a wide range of linguistic phenomena, including coding properties of arguments, such as word order and morphological case.

(25) a. PERSON: first, second > third
b. REFERENTIALITY: pronoun > proper name > common noun
c. ANIMACY: human > animate > inanimate
d. DEFINITENESS: definite > specific > non-specific

In these scales, prominence is understood as akin to "cognitive salience" (McCarthy 2001; Newmeyer 2002) or "topicality" (Givón 1984), where these are determined on the basis of some semantic properties of NPs.

The TH is fundamentally different from these hierarchies:
It ranks semantic roles, which are event-based properties (cf. Evans 1997);
the others rank properties of "fillers" of semantic roles.

CONSEQUENCES OF THIS CONCEPTION FOR ARGUMENT REALIZATION

• THE STATUS OF THE TH: The TH is not an independent theoretical construct,
but emerges from the interaction of properties that determine salience.

• THE SEMANTIC ROLES THAT FIGURE IN THE TH:

— This conception ranks adjuncts, as well as arguments, and it can also rank arguments which do not cooccur in the same predicate.

— The relevant lexical semantic notions can be finer-grained than on the structural conception because they are not limited to those defined over an event structure and, thus, may involve a more varied set of semantic properties.

• THE CONTRIBUTION OF SUCH A TH TO ARGUMENT REALIZATION:

— This conception alone can't determine argument realization, nor can it define possible semantic role combinations (e.g., what excludes a verb with experiencer and goal arguments?).

— Although various lexical entailments have a contribution to make to subject and object selection,
their contribution is not equally important.

Those entailments that single out notions defined over the event structure are the most important,
showing that reference to the geometry of event structure figures in subject/object selection.

EXAMPLE: Of Dowty's Proto-Agent entailments, "causation" outranks all the others in determining subjecthood (Davis & Koenig 2000:75-76): if an argument has the causer entailment, it is subject. (See Lecture Notes VI for evidence in support of this claim.)

Why does causation outrank other Proto-Agent entailments in subject selection?
It is the only Proto-Agent entailment corresponding to a notion definable in event structures.

A causer is the least embedded argument in a typical complex event structure.
Supposing that event structure prominence is preserved in argument realization,
then, the causer would take precedence over any other argument for subject selection.

(26) [[x ACT] CAUSE [BECOME [y <*STATE*>]]]

ANOTHER EXAMPLE: Among the Proto-Patient entailments, "changes state" outranks the others in determining objecthood. (See Lecture Notes VI for evidence in support of this claim.)
It too may be defined over proposed event structures via the predicate BECOME (or CHANGE).

— Event structure may be important to subject and object selection, but alone it is inadequate and will need to be supplemented by other event-based statements of prominence.

Event structure doesn't impose a semantic prominence relation on the arguments of multi-argument simple event verbs (e.g., *see, wipe*): their arguments are equally embedded.
But statements as in (22) may define semantic prominence relations and, hence, may determine the relative syntactic prominence of the arguments.

In fact, many properties identified by Dowty and Fillmore lack analogues in event structures.
They often differentiate among finer-grained instantiations of the coarse-grained roles defined by event structure positions.
The use of such event-based properties allows semantic roles to be broken down into smaller components that figure in argument realization.
Such properties will be investigated in the next lectures.

CONCLUSIONS REGARDING THE TH IN ARGUMENT REALIZATION: A TH used to determine a verb's argument realization options might arise in large part from more basic properties of the verb's lexical semantic representation; it should not be considered a primitive construct.

7 A second case study: Fillmore's (1968) hierarchy revisited

(27) Agent > Instrument > Patient

• This often-cited hierarchy cannot be a universal primitive construct:

— The structural interpretation is not possible.
It doesn't capture possible syntactic c-command relations among NPs with these roles.
In sentences with an agent, an instrument, and a patient, the instrument is never structurally more prominent than the patient.

— The salience interpretation is lacking: Instruments are always less salient than patients.

• What is the source of this hierarchy? It conflates two generalizations:

— The causer argument of a change of state verb is more prominent that the patient.

— The causer argument can be "filled" by agents, natural forces, instruments (in English). The ranking 'agent > instrument' indicates that the choice of instrument as cause precludes the expression of an agent, while the choice of an agent as cause does not preclude the expression of instrument.

8 Conclusions: A revised perspective on the TH and on existing THs

• Various generalizations are statable with the same TH notation, but these generalizations fall into different types, and neither can, nor should, be given a single explanation.

• Every posited TH deserves serious scrutiny as it represents an attempt to capture a linguistic generalization.

• A given TH may remain a convenient way of stating a valid generalization even if it is derivative.

• The TH as it figures in argument realization is epiphenomenal, derived from the basic elements of lexical semantic representation; nevertheless, these elements should, in principle, give rise to a clear ranking of semantic roles.

• Other posited THs, used as statements of various generalizations over semantic roles, may differ in the roles they rank and in the relative ranking of these roles.

• These differences should be determinable from what each ranking aspires to represent and what generalizations it is intended to capture.

9 A reexamination of meaning preservation in the semantics-syntax mapping

The examination of existing THs suggests that semantic prominence relations may have a role to play in argument realization: specifically semantically more prominent arguments map to syntactically more prominent positions.

Thus, a TH embodies a particular perspective on a desideratum for the syntax-semantics mapping:

A DESIDERATUM: The semantics-syntax mapping should PRESERVE at least some facets of the semantic representation in the syntax.

As noted in Lecture Notes I, this desideratum is pervasive, though often left implicit
(e.g., the notion of semantic transparency).

There are two common approaches to the semantics-syntax mapping that satisfy this desideratum:
— equivalence class preserving mappings
— prominence preserving mappings, as embodied in a TH

THE CHALLENGE BOTH APPROACHES FACE IN SATISFYING THIS DESIDERATUM:
There is a discrepancy between the richness and variety of semantic notions and the paucity of syntactic notions they are mapped onto (subject, (first, second) object, indirect object, oblique).

CONSEQUENCE: A theory of argument realization must take a stand on how a semantics-syntax mapping equalizes the number of semantic and syntactic distinctions.

QUESTION: These two approaches accomplish this differently; which is more successful?

9.1 Equivalence class preserving mapping

AN EQUIVALENCE CLASS PRESERVING MAPPING treats each equivalence class of arguments (i.e., arguments with the same semantic role) and/or equivalence classes of verbs in the same way.

(28) Agents are subjects, patients are objects.

KEY POINT: Equivalence class preservation takes the relationship of individual arguments to their verb as most important in lexical semantic representation.

(29) THE UNIFORMITY OF THETA ASSIGNMENT HYPOTHESIS (UTAH): Identical thematic relationships between items are represented by identical structural relationships between those items at the level of d-structure. (Baker 1988:46, (30))

MOTIVATION: Grammatical relation-changing phenomena: dative alternation, applicatives, causatives, noun incorporation; extended to other near-paraphrases (e.g., psych-verbs; Belletti & Rizzi 1988).

(30) a. Martha gave an apple to Myrna./Martha gave Myrna an apple.
b. Sally fears glass elevators./Glass elevators frighten Sally.

ADVANTAGE: Retention of transparency in the mapping from lexical semantics to syntax.

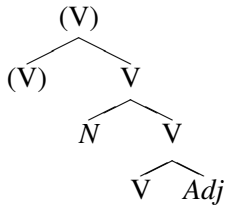
PROBLEM: Apparent many-to-many character of the mapping, which arises because the semantic representation appears to make more distinctions than the syntactic representation.

STRATEGIES FOR OVERCOMING THIS PROBLEM:

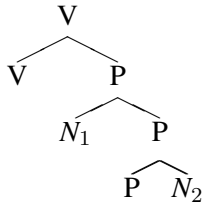
• Use abstract syntactic representations to increase number of syntactically-encoded distinctions.

e.g., Fillmore's Case Grammar, VP-shells (Larson 1988; Hale & Keyser 1997, 2002).

(31) a. We cleared the screen./The screen cleared.
b. Deadjectival verb (Hale & Keyser 1997:211, (15))
'(CAUSE) screen/N BE *CLEAR*/Adj'



(32) a. We saddled the horse.
b. Denominal locatum verb (Hale & Keyser 1997:213, (21))
'PROVIDE horse/N_1 with *SADDLE*/N_2'



Verbs are derived by "successive incorporation into immediately governing heads" (H&K 1997:205) of the root, subject to the Head Movement Constraint (Baker 1988; Travis 1984).
This constraint explains why certain verb meanings are unattested:
they involve incorporations that would violate this constraint.

Simple transitive verbs do not all have the same lexical syntactic structure:
— object of *clear*, which is the entity that assumes the state named by the verb, originates as the specifier of a verbal projection in (31b).
— object of *saddle*, which names the place that will be provided with the thing named by the verb, originates in the specifier of a prepositional projection in (32b).

Use of abstract syntactic representations results in syntactic structures that mirror the structure of proposed semantic representations; cf. generative semantics.

• Use coarser-grained semantic roles or generalized semantic roles (macroroles, Foley & Van Valin 1984, Van Valin & LaPolla 1997; proto-roles, Dowty 1991) to reduce number of semantic distinctions to number of syntactically-encoded distinctions (i.e., subject, direct object, indirect object).

Coarser-grained roles

AN EXAMPLE: Levin & Rappaport Hovav's (1995) notion of IMMEDIATE CAUSE: the participant in an eventuality which is immediately involved in bringing it about. This notion subsumes agents, as well as natural forces, certain instruments, the emitter arguments — whether animate or inanimate — of verbs of sound and light emission such as *rumble* or *sparkle* and some other inanimates (i.e., subjects of *quiver* or *pulsate*). (See also Van Valin & Wilkins's (1996) related notion "effector".)

(33) a. The hooligans broke the car windows. (agent)
b. The crane loaded the truck. (self-propelled instrument)
c. The hammer broke the window. (manipulated instrument)
d. The sun dried the clothes. (natural force)
e. The water sparkled in the sunlight. (inanimate emitter)
f. The stream babbled. (inanimate emitter)
g. The aspen leaves quivered. (other inanimate entity)

Generalized semantic roles

Such roles are not the same as coarser-grained roles as they are not defined by necessary and sufficient conditions; see L&RH 2005, Chapter 3.

Role and Reference Grammar's (RRG) macroroles: Actor and undergoer

(34) Original RRG actor-undergoer hierarchy (Van Valin 1990:226):
Agent > Effector > Experiencer > Location > Theme > Patient

(35) Actor is determined by working top-down; undergoer by working bottom-up.

(36) Revised RRG actor-undergoer hierarchy (Van Valin & LaPolla 1997:126-127):

Arg of DO	>	1st arg of **do**′(x,...	>	1st arg of **pred**′(x, y)	>	2nd arg of **pred**′(x, y)	>	Arg of state **pred**′(x)

• Weaken equivalence class preservation, allowing the lexical semantics-to-syntax mapping to be many-to-one, rather than one-to-one; each semantic equivalence class, then, must have a specific syntactic realization, though it need not be a unique realization.

e.g., Some implementations of Baker's UTAH.

• Use underspecified syntactic representations as a way of creating equivalence classes of syntactic realizations, thus decreasing the number of syntactic distinctions.

e.g., LFG's Lexical Mapping Theory (Bresnan & Kanerva 1989), where the feature [–r] is assigned to patient/theme arguments to allow them either subject or object realizations.

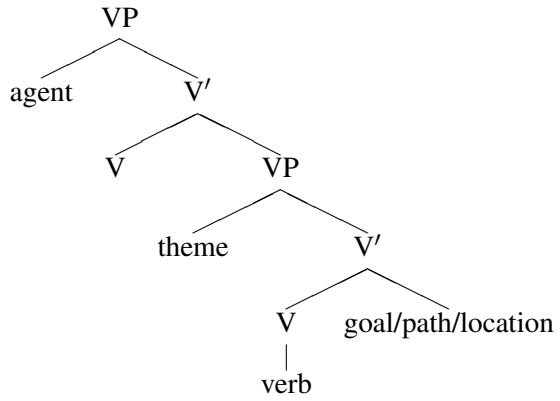
Grammatical relations are defined in terms of the features [r] (restricted) and [o] (object):
subjects are [–r, –o], while objects are [–r, +o]; thus, they share the feature [–r].

• Combine several of these strategies.

Baker (1997) uses coarse-grained semantic roles and abstract syntactic representations.

(37) a. An agent is the specifier of the higher VP of a Larsonian structure.
b. A theme is the specifier of the lower VP.
c. A goal, path or location is the complement of the lower VP.
(Baker 1997:120-121, (76))

(38) Syntactic configuration assumed by Baker (1997)



ANOTHER PROBLEM: Inability to deal with context dependence generally.

9.2 Prominence preserving mappings

A PROMINENCE PRESERVING MAPPING maintains the prominence relations encoded in the lexical semantic representation in the syntax.

(39) the syntactic prominence of an argument is determined (or largely determined) by its thematic prominence (Jackendoff 1992:22)

EXAMPLE: Subject choice in English

(40) If there is an A [=Agent], it becomes the subject; otherwise, if there is an I [=Instrument], it becomes the subject; otherwise, the subject is the O [=Objective, i.e., Theme/Patient]. (Fillmore 1968:33)

(41) The argument of a verb bearing the highest-ranked semantic role is its subject.
Agent > Instrument > Theme/Patient

Some researchers believe that given the drawbacks of equivalence class preservation, prominence preservation is the best alternative to it.

(42) Since semantics is not just interpretive and crucially determines syntax, but since one-to-one correspondence between semantic and syntactic representations is untenable, let us consider the next best thing, namely, homomorphy. ... For our purposes, a mapping of an SR to an SS will be homomorphic if it preserves the relative relations of the elements involved. (Bouchard 1995:95)

(43) Homomorphic Mapping Principle: In a mapping from SR to SS, dominance relations are preserved. (Bouchard 1995:96, (38))

KEY POINT: Prominence preservation takes the overall hierarchical structure of the lexical semantic representation to be critical.

WHY PROMINENCE PRESERVATION IS DESIRABLE: Compatible with the conjecture that the compositional structure of the semantic representation is preserved in the syntactic representation.

(44) Constituent structure at D-structure represents (the) semantic compositionality (of events). (Marantz 1993:143, (51))

More generally, prominence preservation satisfies the meaning-preservation desideratum, but embodies a different understanding of what satisfying it means than equivalence class preservation.

THE CHALLENGE: Defining semantic and syntactic prominence, as the approach presupposes semantic and syntactic representations over which prominence relations among arguments can be defined, as well as an understanding of what prominence means with respect to each representation.

• SYNTACTIC PROMINENCE: c-command; grammatical relation or morphological case hierarchies.

(45) a. subject > object > indirect object > oblique
(cf. Keenan & Comrie's (1977) NP-Accessibility Hierarchy)

b. nominative > accusative > dative > oblique cases

• SEMANTIC PROMINENCE: thematic hierarchies, "c-command" defined over predicate decompositions or event structures.

— *Thematic hierarchies*

A THEMATIC HIERARCHY is a language-independent ranking of possible semantic roles, which establishes prominence relations among them.

(46) The Relativized UTAH: If a verb α determines theta-roles θ_1, θ_2, ..., θ_n, then the lowest role on the Thematic Hierarchy is assigned to the lowest argument in constituent structure, the next lowest role to the next lowest argument, and so on. (Larson 1988:382)

(47) ... syntactic configurations projected from a given θ-grid should reflect the hierarchy, so that for every pair of θ-roles in the grid, the higher role in the hierarchy is projected to a higher structural position ... (Belletti & Rizzi 1988: 344, n36)

— *Semantic c-command*

(48) In an SF [=semantic form] representation, a node α L-commands β iff a node γ which either directly dominates α or dominates α via a chain of nodes type-identical with γ also dominates β. (Wunderlich 1997:104, (20))

(49) Restriction on structural arguments: an argument is structural only if it is either the lowest argument or (each of its occurrences) L-commands the lowest argument. (Wunderlich 1997:112, (35))

(50) die Gäste tranken den weinkeller leer
'the guests drank the wine cellar empty'
(German; Wunderlich 1997:118, (46a)

(51) λz λy λx λs [DRINK(x,y)(s) & BECOME(EMPTY(z))(s)]
x and z are structural arguments, but y is not
(cf. Wunderlich 1997:121, (52b))

ADVANTAGES:

• Prominence preservation is compatible with semantic and syntactic representations that make different numbers of core distinctions.

— Prominence preservation only requires that each asymmetric relation between two arguments in the semantic representation be mapped onto a similarly asymmetric relation in the syntax.

— Within this context, the discrepancy in number of distinctions is not an issue as long as the syntactic representation has enough positions to accommodate all of a verb's arguments. This is feasible since a verb generally takes one to three arguments, and usually three or four syntactic positions/grammatical relations are recognized (i.e., subject, direct object, indirect object, oblique).

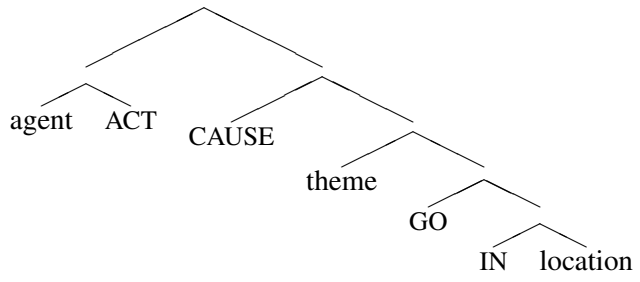
— As the mapping is sensitive to the relative prominence of arguments, the specific semantic relation each argument bear to its verb is irrelevant; thus, it does not matter how many semantic roles there are.

AN EXAMPLE: Either agents or themes may be realized as subjects, as long as all their coarguments are lower ranked; similarly, either themes or locations may be realized as objects, as long as they have a higher ranked coargument.

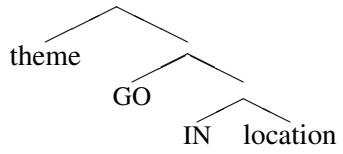
(52) Agent > Theme > Location

(53) a. Kelly (agent) moved the cat (theme) into the room (location).
b. The cat (theme) entered the room (location).

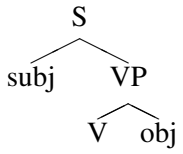
(54) Abstract semantic hierarchical structure for *move* (transitive):



(55) Abstract semantic hierarchical structure for *enter*:



(56) Hierarchical syntactic structure of a sentence:



NOTE: Prominence preservation does not require equivalence class preservation; it merely constrains the relative hierarchical relationships between the syntactic expressions of pairs of arguments, but does not force an argument to have a unique syntactic expression.

• Since prominence preservation does not require that an argument bearing a particular semantic role have a unique syntactic realization, such approaches can handle the context dependence of argument realization and the many-to-many character of the semantics-syntax mapping.

(57) A theme can be realized as a subject only in the absence of an agent.

9.3 Conclusions

• Theories of argument realization are developed in the context of the assumption that the semantics-to-syntax mapping preserves meaning.

• Prominence preserving approaches seems better able to handle the challenges of argument realization, particularly context dependence.

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